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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/705,935 | 11/13/2003 | Shunji Kamijima | 117384 | 6584 |
| 25944 | 7590 | 01/13/2005 | EXAMINER | |
| OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320 | | | HAN, JASON | |
| | | | ART UNIT | PAPER NUMBER |
| | | | 2875 | |

DATE MAILED: 01/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|---|--|
| Office Action Summary | Application No. 10/705,935 | Applicant(s) KAMIJIMA, SHUNJI | |
| | Examiner Jason M Han | Art Unit 2875 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to independent Claim 1 have been considered but are moot in view of the new ground(s) of rejection. All subsequent claims have been rejected in light of dependency on the new independent Claim 1, which cites the new structural limitation "from a color wheel".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2 and 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dewald (U.S. Publication 2001/0008470) in view of Oe (U.S. Patent 5863113).
3. With regards to Claim 1, Dewald discloses a rod integrator [Figure 6: (300)] having a reflective surface whereby emitted light is incident on an incident-end opening [Figure 6: (304)] from a light source [Page 2, Paragraph 15; Figure 1: (102)] and traverses through the rod integrator to an emerging-end opening [Figure 6: (308)]; and an end face [Figure 6: (306)] of an outer periphery of the emerging-end opening that receives incident light [Figure 6: (608)] from a color wheel [Figure 6: (606)] toward a central axis of the rod integrator.

Dewald does not specifically teach the end face comprising of a scattering or blaze surface whereby the incident light from the color wheel is reflected toward the central axis of the rod integrator.

Oe teaches such a scattering surface [Figure 6: (6)] located on an end face of a light guide/integrator that reflects light on the end face toward a central axis of the light guide/integrator [Figure 8: central axis defined as a vertical axis perpendicular to the end face (6, 8)]. In addition, Oe teaches, "The incident light with an incident angle more than the critical reflective angle to the optical flat surface can be reflected without any substantial loss. Since the light does not leak, it is possible to utilize the light effectively to increase the value of luminance of the entire light emitting surface [Column 7, Lines 60-65]."

It would have been obvious to modify the end face of the rod integrator of Dewald to incorporate the scattering surface of Oe to provide a desired optical effect on the illumination and increase overall light efficiency. Such optical designs are commonly seen with blaze gratings, fresnel lenses, and/or prismatic lenses, whereby light efficiency is enhanced via the end face comprising various angles of incident light to reflect angles dependent of a critical angle, ensuring total reflection as desired. The abovementioned principle, as taught by Oe, is pertinent to the applicant's invention and Dewald since the incident light from the color wheel may be reflected off or not depending on the incident angle, thus utilizing the light effectively. Lastly, it should be noted that the examiner has rendered the broadest interpretation [MPEP 2111] wherein the rejection meets all structural limitations of the claim.

4. With regards to Claim 2, Dewald in view of Oe discloses the claimed invention as cited above. In addition, both Dewald [Figure 6] and Oe [Figure 8: central axis defined as a vertical axis perpendicular to the end face (6, 8)] teach the end face being substantially perpendicular to the central axis.

5. With regards to Claim 5, Dewald in view of Oe discloses the claimed invention as cited above. In addition, Oe teaches the light guide/integrator wherein the scattering surface of the end face includes a plurality of V-grooves having a very small depth [Figure 8: (6)].

6. With regards to Claim 6, Dewald in view of Oe discloses the claimed invention as cited above. In addition, Oe teaches the light guide/integrator wherein the end face further has a reflecting surface around the scattering surface [Figure 8: (8)]. Oe further discloses, "the surface of the flat areas 8 of the light guide 1 is preferably an optically flat surface, in particular, to be a mirror surface. The incident light with an incident angle more than the critical reflective angle to the optical flat surface can be reflected without any substantial loss [Column 7, Lines 57-62]."

7. With regards to Claim 7, Dewald in view of Oe discloses the claimed invention as cited above. In addition, both Dewald [Figure 1: (102, 106)] and Oe [Figure 8: (4, 1)] teach an illuminator with a light source and a rod/light integrator.

8. With regards to Claim 8, Dewald in view of Oe discloses the claimed invention as cited above. In addition, Dewald teaches, "Micromirror-based display systems typically operate the micromirrors in a digital, or bistable, manner. Digital operation fully deflects a given micromirror to either a first position or a second position. The illumination optics

of the display device illuminate the entire array of micromirror cells. Micromirrors deflected to the first position reflect light along a first path, whereas micromirrors deflected to a second position reflect light along a second path. The projection optics of the display system collects the light from the mirrors in the first position and focus the light onto an image plane. The light reflected by mirrors in the second position is prevented from reaching the image plane. An image pixel associated with a mirror in the first position is brightly illuminated, whereas an image pixel associated with mirrors in the second position are not illuminated. Pulse width modulation creates the perception of gray scale intensities with a digital micromirror device or other spatial light modulator. When using pulse width modulation, a given micromirror element is rapidly turned on and off in response to a digital intensity word. The duty cycle of the mirror determines the total amount of light contributed to an image pixel. If the pixel is pulsed quickly enough, the human eye will accurately measure the average intensity of the pixel, but will fail to detect the pulsing [Page 1, Paragraphs 6-7; underlines and highlight added by examiner for emphasis]."

9. With regards to Claim 9, Dewald in view of Oe discloses the claimed invention as cited above. In addition, both Dewald [Figure 1] and Oe [Figures 9(a-c)] teach an optical device that includes the rod/light integrator.

10. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dewald (U.S. Publication 2001/0008470) in view of Oe (U.S. Patent 5863113), as applied to Claim 1 above, and further in view of Hansen (U.S. Patent 3622231).

Dewald in view of Oe discloses the claimed invention as cited above. In addition, Oe teaches the light guide/integrator having different blaze angles located on the end face [Figure 8: (6, 8)]. However, neither Dewald nor Oe specifically teaches the blaze angle being defined by a normal of the blaze surface and the central axis, whereby the longer the distance between the blaze surface and the central axis is, the larger the blaze angle is.

Hansen teaches a lens having optics radially symmetrical about a central axis [Figure 2], whereby the optics are at determined angles for transmitting a light at a desired direction [see also Abstract].

It would have been obvious to modify the rod integrator of Dewald with the scattering surface of Oe to further incorporate the teaching of Hansen whereby appropriate angles are distributed along the end face in providing a desired effect on the illumination, in this case, a uniform light distribution. Such optical designs are again commonly seen with blaze gratings, fresnel lenses, and/or prismatic surfaces.

11. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Dewald (U.S. Publication 2001/0008470) in view of Oe (U.S. Patent 5863113), as applied to Claim 1 above, and further in view of Waymouth (U.S. Patent 4895420).

Dewald in view of Oe discloses the claimed invention as cited above, but does not specifically teach the reflectance of the end face being approximately 80 percent or more.

Waymouth teaches, "A second influential aspect is the reflectivity of the walls. Since a loss occurs with each reflection, a high reflectivity at grazing angles is

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important. Unfortunately, metallic reflectors do not have high reflectance at grazing angles. Most metallized films, and even polished anodized aluminum, have reflectances of less than 95% at perpendicular incidence; and at grazing incidence, the reflectance percentage drops even lower, to 70 or 80 percent. Enhanced reflectors are known, in which a metallized film is overcoated with a transparent layer having a precise thickness relative to a particular wavelength of light. The film over metal light guides can achieve reflectances of greater than 95% for normal incidence. While it is theoretically possible to further enhance reflectance for grazing angles, the enhancement is normally limited to only one color, and one angle of incidence. The enhanced film on metal light guide is then much less effective for the range of grazing angles produced by most radiating sources, and also for the spectrum of white light normally produced and desired. There is then a need to provide an enhanced reflector effective over a range of grazing angles, and there is a need to provide a light guide with enhanced reflectivity for a broad range of wavelengths. There is a further need for a wall material for use in light guide systems having high reflectance at grazing angles that is economical and adaptable to simple manufacturing processes [Column 1, Line 43 – Column 2, Line 2; underlines added by examiner for emphasis].”

It would have been obvious to modify the rod integrator of Dewald with the scattering surface or Oe to further incorporate the high reflectance metallized film of Waymouth to prevent light loss and ensuring efficiency.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason M Han whose telephone number is (571) 272-2207. The examiner can normally be reached on 8:00am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sandra O'Shea can be reached on (571) 272-2378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JMH (1/7/2005)



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